# THE INSTITUTION OF PRODUCTION ENGINEERS

## JOURNAL

*(August, 1947, Vol. XXVI, No. 8.)*

Contents:



PUBLISHED BY THE INSTITUTION
36, PORTMAN SQUARE, LONDON, W.1



PRICE 5/-

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1947-48

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## Student Centre Honorary Secretary

**Loughborough College :** T. D. Walshaw, B.Sc., Loughborough College, Loughborough, Leics.

# INSTITUTION NOTES

## *August, 1947*

**September Meetings.**

8th Luton Section. A Film Show will be given by W. Whitworth Taylor, Esq., at the Town Hall, Luton, at 7-0 p.m.

9th London Graduate Section. A lecture on "Metrology" has been arranged; full details are not yet available.

18th Birmingham Section. A lecture on "Cold Forging" will be given by T. C. Parker, M.I.P.E., at the James Watt Institute, Great Charles Street, Birmingham, at 7-0 p.m.

18th Glasgow Section. A Works Visit to Messrs. Anderson, Boyes & Co., Ltd., Motherwell, has been arranged, starting at 7-30 p.m.

19th Birmingham Graduate Section. A Dance will be held at the Botanical Gardens, Birmingham.

24th Wolverhampton Section. A lecture on "The Future Development of Machine Tool Design," preceded by a film, will be given by J. H. Wilkinson, A.M.I.P.E., at the Wisemore Schools, Walsall, at 7-0 p.m.

**Honours**

Our sincere congratulations are extended to Mr. J. Cunningham, M.I.P.E., and Mr. W. H. Starr, Int.A.M.I.P.E., whose names appeared in the recent Birthday Honours list.

Mr. Cunningham, who was awarded the M.B.E., is General Manager of Messrs. Ruston & Hornsby, Ltd., Lincoln, and Mr. Starr, who received the B.E.M., is Production Manager of Messrs. Brintons, Ltd., Kidderminster.

**Personal**

Mr. L. Walker, M.I.P.E., has been appointed a Director of Messrs. Noble & Lund, Ltd., Gateshead.

Mr. H. Davenport, A.M.I.P.E., has recently taken up an appointment with Messrs. Blaw-Knox, Ltd., Rochester, as Chief Draughtsman.

Mr. R. N. Line, A.M.I.P.E., is taking up a position with General Motors, of Melbourne, Australia, in which he will be responsible for Time Study, Planning, Engineering, Costing and Machine Design.

Mr. J. G. B. Morland, A.M.I.P.E., has been appointed Assistant to the Director of the Industrial Machinery Dept., of Messrs. Seligson & Clare, Ltd., Johannesburg, S. Africa.

Mr. Noel S. Fowler, A.M.I.P.E., has been demobilised from the Army and is now acting as Outside Technical Representative to Messrs. W. Sisson & Co., Ltd., Gloucester.

Mr. G. E. Smith, Int.A.M.I.P.E., is now General Manager of The Anglo Tool Company, Romford, Essex.

Mr. C. Cantrell, Int.A.M.I.P.E., has been appointed to the position of Chief Planning Engineer to Messrs. W. & T. Avery, Ltd., Sherburn-in-Elmet, near Leeds.

Mr. D. L. Thompson, Int.A.M.I.P.E., has joined the staff of the North-East Engineering Bureau as Planning and Production Engineer.

Mr. F. Tong, Int.A.M.I.P.E., has now left the Ministry of Supply and has taken up an appointment as Technical Representative on the Machine Tool Staff of Messrs. G. Cohen, Sons & Co., Ltd., of Leeds.

Mr. A. H. Poole, Grad.I.P.E., has been demobilised from the Army, and has returned to Messrs. J. G. Kincaid, of Greenock, as Technical Assistant.

Mr. Claude W. Cook, Stud.I.P.E., has taken up a position as T.W.I. Instructor with Messrs. Moreland and Impey, Northfield, Birmingham.

**Obituary**

We deeply regret to announce the deaths of Mr. D. D. Archibald, M.I.P.E., of Manchester Section, and Mr. A. Barber, A.M.I.P.E., of Coventry Section.

**Lord Austin Prize—Revised Conditions of Award**

(*a*) Graduates up to the age of 28 years will be allowed to enter for the Lord Austin Prize by submitting ONE essay during their term as Graduates.

(*b*) Graduates entering for the Lord Austin Prize will be given 3 months in which to complete the essay. The closing date for entries each year will be 30th September.

(*c*) Details and lists of subjects will be published normally in the July and August issues of the Institution's Journal each year.

**List of Subjects for 1947**

1. Metal cutting processes and relative developments in machine tools.
2. Mechanical handling as an aid to production.
3. The changing nature of human relations in industry and its effect on production.
4. The comparative usefulness and economics of die-casting processes.
5. How efficient research and development can assist a manufacturing organisation.

**Addresses of Members.**

The list appearing below contains the names of members with whom Head Office has been unable to get in touch at the addresses held on record. It would be appreciated if such members, or other members knowing their whereabouts, would kindly notify us of their present addresses :

Arthur F. Abrahams, GRAD.I.P.E.
William D. J. Annear, A.M.I.P.E.
Robert Atkinson, STUD.I.P.E.
Samuel G. Atkinson, INT.A.M.I.P.E.
John Barclay, GRAD.I.P.E.
Thomas Barlow, INT.A.M.I.P.E.
Jack L. Barton, A.M.I.P.E.
Cyril Bell, GRAD.I.P.E.
F. E. Bickley, A.M.I.P.E.
Sidney G. Booth, O.B.E., M.I.P.E.
Edward A. Bostock, A.M.I.P.E.
A. L. J. Brain, M.I.P.E.
Thomas H. Burnham, A.M.I.P.E.
A. H. Copeland, A.M.I.P.E.
John Carle, A.M.I.P.E.
William Craig, A.M.I.P.E.
G. E. Curry, A.I.P.E.
George D. R. Davison, A.M.I.P.E.
Arthur Docking, M.I.P.E.
Richard P. Dodsworth, M.I.P.E.
R. A. Duncan, A.I.P.E.
Sidney J. Edwards, INT.A.M.I.P.E.
William E. Edwards, A.M.I.P.E.
Arthur Evans, INT.A.M.I.P.E.
Richard M. Fegan, A.M.I.P.E.
Richard Fitzhenry, A.M.I.P.E.
Norman T. Ganley, INT.A.M.I.P.E.
Gordon H. G. Garbett, GRAD.I.P.E.
Major B. R. Gimson, R.E.M.E.
Cyril Godden, A.M.I.P.E.
Harold Hadfield, A.M.I.P.E.
Edward H. S. Hall, M.I.P.E.
W. M. Helley, A.M.I.P.E.
Alfred Hemmingway, M.I.P.E.
P/O K. W. Hinds, GRAD.I.P.E.
Geo. H. Hockley, GRAD.I.P.E.
Alfred A. Hodge, A.M.I.P.E.
Bevan G. Horstmann, A.M.I.P.E.
William H. Howcutt, INT.A.M.I.P.E.
Crawford Hopkins, INT.A.M.I.P.E.
Thomas Humphrys, INT.A.M.I.P.E.
Douglas M. Irving, A.M.I.P.E.
John F. James, INT.A.M.I.P.E.
Henry V. Jarratt, M.I.P.E.
P. M. Kaul, GRAD.I.P.E.
William Keeling, GRAD.I.P.E.
Arthur T. Lane, M.I.P.E.
Thomas Lever, INT.A.M.I.P.E.
Albert W. Lones, INT.A.M.I.P.E.
Harry Longden, STUD.I.P.E.
Leon Luttig, STUD.I.P.E.
Gerard J. Maher, A.M.I.P.E.
David J. Main, STUD.I.P.E.
C. Mason, INT.A.M.I.P.E.
Francis McKeown, INT.A.M.I.P.E.
Douglas A. Miller, A.I.P.E.
H. W. Milstead, A.M.I.P.E.
Stanley D. J. Narraway, A.M.I.P.E.
John C. Norris, A.M.I.P.E.
W. Nugent, A.M.I.P.E.
Lt.-Col. A. W. Page, M.B.E., M.I.P.E.
Ralph Parish, INT.A.M.I.P.E.
William J. Parker, STUD.I.P.E.
Griffith N. Parry, INT.A.M.I.P.E.
2nd Lieut. E. J. Parson.
S. Pearce, GRAD.I.P.E.
Edward J. Peek, INT.A.M.I.P.E.
Raghu Nath Rai, GRAD.I.P.E.
David D. Rayner, M.I.P.E.
Charles E. Redman, INT.A.M.I.P.E.
Wm. G. Remington, INT.A.M.I.P.E.
W. J. Rose, A.M.I.P.E.
Geo. C. S. Seymour, INT.A M.I.P.E.
John H. Snape, M.I.P.E.
Thomas H. Sparrow, A.M.I P.E.
I. H. B. Stagg, A.M.I.P.E.
Harold Standring, INT.A.M.I.P.E.
James D. Statton, M.I.P.E.
Brian J. Stedman, GRAD.I.P.E.
W. H. J. Stockley, A.M.I.P.E.
Wilfred L. J. Stone, STUD.I.P.E.
Leonard C. Stotter, INT.A.M.I.P.E.
Percy J. Swales, A.I.P.E.
Joseph F. G. Tadman, STUD.I.P.E.
Percival J. Taylor, M.I.P.E.
F. H. Thompson, A.M.I.P.E.
Patrick A. Tipper, STUD.I.P.E.
Frederick W. Warren, A.M.I.P.E.
Paul White, INT.A.M.I.P.E.
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E. Wilkinson, STUD.I.P.E.
Leslie G. T. Williams, INT.A.M.I.P.E.
R. G. Williams, A.M.I.P.E.

**Intensive Course for the Higher National Certificate in Production Engineering.**

A further course for the Higher National Certificate in Production Engineering is commencing at Wandsworth Technical Institute on September 8th, 1947. This course is an intensive one for ex-servicemen and is of 9 months duration.

It is the only scheme of its kind operating at the present time. Full details may be obtained from:

The Principal,
Wandsworth Technical Institute,
Wandsworth High Street,
S.W.18.

**Books Received.**

*Equal Reward for Equal Effort*, by F. W. Deakin.

*Factory Management and Control*, by J. H. Lower, A.F.R.Ae.S. Machinery Publishing Co., price 3/6.

*Precision Workshop Methods*, by H. J. Davies. Edward Arnold & Co., price 20/-.

*Metal Working and Heat Treatment Manual, Vol. II*, by F. Johnson, D.Sc. Paul Elek, price 17/6.

*Modern Assembly Processes*, by J. L. Miller, (Revised Second Edition). Chapman & Hall, Ltd., price 18/-.

**Issue of Journal to New Members**

Owing to the fact that output has to be adjusted to meet requirements, and in order to avoid carrying heavy stocks, it has been decided that the Journal will only be issued to new Members from the date they join the Institution.

**Important**

In order that the Journal may be despatched on time, it is essential that copy should reach the Head Office of the Institution not later than 40 days prior to the date of issue, which is the first of each month.

# AMERICAN SOCIETY OF TOOL ENGINEERS

## VISIT OF MR. H. E. LINSLEY

A meeting of great interest and significance to members of the Institution and Production Engineers in general took place on Saturday, July 19th, 1947, when Mr. H. E. Linsley delivered an address to the Institution of Production Engineers at Wolverhampton.

Mr. H. E. Linsley.

Mr. Linsley, who has been Machine Tool Editor of "The Iron Age," New York, since 1945, came to this country in response to an invitation from the Wolverhampton Section Committee to the American Society of Tool Engineers, and before giving his address, he read a message of goodwill on behalf of the President of the A.S.T.E., Mr. W. B. Peirce.

Born and educated in England, Mr. Linsley served as a flying officer in the R.F.C. during the first World War. After the war he completed a special engineering training course and went to Paris as a draughtsman with the National Radiator Co. in 1922. Later he took charge of product and tool design at the Company's Clichy factory, remaining there until 1927, when he went to the United States.

After spending some time with the Pierce Arrow Motor Car Co., and the Curtiss Aeroplane and Motor Co., in 1933 he joined the Wright Aeronautical Corporation as a production engineer. In consequence of the many articles he had written for the technical press, he was transferred to the Public Relations Dept. and subsequently took charge of all technical publicity. In this capacity he travelled extensively throughout the U.S. as a speaker at both technical and non-technical societies.

He is a past-Chairman of the Northern New Jersey Chapter of the A.S.T.E. and a member of the Army Ordnance Association, the American Welding Society, and the Newcomen Society of England.

# "THE MACHINE TOOL AND YOU"

by H. E. LINSLEY

GENTLEMEN,

I find myself to-day in a rather peculiar position—in a sort of dual role. By birth, education and early training, I am an Englishman, and I am very proud of that fact, but by adult experience, by my own choice, and by actual naturalisation, I am an American, and I am equally proud of that. But in speaking to you to-day, I am speaking not as an Englishman nor yet as an American, but as one of yourselves—as a fellow production engineer who happens to have knocked around the world a bit and whose present duties as Machine Tool Editor of " The Iron Age " magazine bring him into close and intimate contact with machine tools in all their forms and in all phases of their application.

As a member also of the American Society of Tool Engineers, it is with considerable satisfaction that I carry out instructions from our National President to deliver to you a message of greeting from A.S.T.E. to the I.P.E. :

(*This message is reproduced on pages* 316-321)

I do not believe I could add anything to what Brad Peirce has said except to say that I most heartily agree with his sentiments. You may recall that on the occasion of Mr. Hancock's last visit to America, he conferred upon the then President of our Society, and upon his successors, honorary membership of your society. I consider this to have been a most significant gesture, for if ever there was a time when Britain and America should stand side by side it is now, and any action which links our two societies must necessarily make for better knowledge and understanding of our mutual problems both as members of parallel technical societies and as members of two sister nations.

You know, gentlemen, that there are certain traditions and beliefs to which all of us subscribe, even though we know them to be factually incorrect. There is, for instance, the story of George Washington and the cherry tree—" Father, I cannot tell a lie. I did it with my little hatchet." Now we know that this was pure invention on the part of the original teller, Parson Weems, but we still tell it to our children, celebrate Washington's birthday with cakes in the form of logs and decorations of little hatchets. Similarly, there is the story of Wellington at Waterloo and his famous " Up, Guards, and at 'em." He most emphatically denied giving that order, and it is unthinkable that a man of his rank and experience should commit so grave a breach of military etiquette. What

he did, of course, was to instruct the commanding officer of the Guards to give the order to advance and, if the remark was made at all, it was probably made by some tough old sergeant-major.

Such stories, and there are scores of them, have become a part of our national folk lore, and since they usually point a good moral or boost our national morale they certainly do no harm. But there is one very common belief that is decidedly harmful and which every one of us should do his utmost to combat. That is the belief that machine tools destroy jobs. That belief goes back several centuries, but first came into real prominence during the so-called industrial revolution in England, about 1760. It was around this time that Hargreaves invented the spinning jenny, which was promptly destroyed by infuriated mobs who were certain that this infamous device would throw thousands out of work. We can smile at such stupidity and ignorance to-day, because we know that without this and subsequent similar inventions, fine cotton goods would be so costly as to be within the reach of only the most wealthy, and the vast cotton industry with its hundreds of thousands of workers would be completely non-existent.

When we consider modern machine tools, however, the picture is somehow made to look different, thanks to the efforts of self-seeking labour leaders—if we dare to call such men leaders—who have sedulously spread the gospel with such effect as to deceive literally millions of ordinarily sensible people who, if they would only think for a few minutes, would see for themselves that such a proposition is utterly false.

It is difficult to combat such wrong thinking, for it is very easy to see that if a machine is developed that will produce as much work as 40 other machines, obviously 39 men are going to be done out of their jobs. In a sense this is true ; those 39 jobs no longer exist, but what is usually overlooked is the fact that even more other jobs immediately, or almost immediately, open up.

Now, I'm not going to give you a lot of statistics ; you wouldn't remember them anyhow, and I don't suppose I am going to say anything startlingly new or original. By the very nature of your jobs you are aware that what I am going to say is correct, but I do want you to get a clear picture so that you can pass it along to others less well informed than yourselves. And it is important that you do pass it along, to your wives, your children, your friends, your fellow-workers, because upon a proper realisation of these truths rests the future prosperity and, indeed, the actual existence of your country as an industrial nation.

Now let's take a practical example of the use of machine tools. Back in the 1600's or thereabouts, when you wanted to buy a gun in America, whether for shooting wild turkeys or Indians, you went to the nearest gunsmith and had him make one for you. He carved

the stock by hand, he forged the barrel by hand with a hammer and an anvil, he hand-hammered and filed all the separate parts, he bored the barrel by hand, and because he was a master craftsman, he did a remarkably fine job and finally presented you with a gun that was amazingly accurate at about 60 paces.

After a while machine tools, crude as they seem to-day, began to be developed and applied to gunmaking, and factory-made guns began to come into the market. Of course the master gunmakers didn't like it worth a hoot, but let's look what happened. First of all, guns were made more cheaply, and by that I don't mean of poor quality, so that where one man had owned a gun before, 50 or 100 could own one now.

What did that mean to the gunsmith ? Well, it meant this, that with so many people owning guns he became a distributor and made a neat little profit on every one he sold ; there was so much repair work to be done that he had to enlarge his premises and hire half-a-dozen men to keep up with the work, to say nothing of the increased trade in bullet moulds, patch cutters, lead, powder, flints and so on, and probably more for his own amusement than anything else, he was able to devote time to the making of special jobs that are the delight of the shooter's heart and the joy of the maker. Or, on the other hand, he was offered a job in the factory where, because of his skill he soon became foreman, or manager, or even owner, and made ten times as much money as before. A new industry was thus created by machine tools, and you have only to look at Remington or Winchester or your own B.S.A. or Armstrong Whitworth to know what that means in terms of jobs created.

I have spoken of guns because they happen to be a particular hobby of mine, and those of you who are not acquainted with antique guns might well marvel at the beauty of the lines and the really magnificent workmanship shown in their manufacture, but just the same, for range, for accuracy, for lightness and of course for interchangeability, they cannot even compare with a modern factory-made gun costing only a fraction of what they cost. The same holds true of any other article formerly made by hand.

"Very well," says your labour leader, "I'll grant that machine tools can make jobs in industries where there were no machines before, but there's a limit to how far you can go. And right now we have reached the saturation point and if we go any further the creation of jobs will stop and machines will replace men." If that were only true, it would be simply wonderful but, unfortunately, it is not.

A few minutes ago we went back to 1600. Now let's go forward to some future year and try to imagine that the day of the workerless factory has arrived. Up in his plush-lined office, the owner of the factory pushes a button. Railroad cars stop at the door and auto-

matically discharge bars and sheets to an automatic conveyor that automatically sorts them and delivers them to batteries of automatic machines. Wheels turn and presses pound, and refrigerator casings flow down a conveyor to be automatically welded and automatically painted. They go to the assembly department where automatically made power units are automatically installed, and finally the finished product is automatically loaded into freight cars, untouched by human hands.

Such a factory is, to say the least, improbable, but it is possible. So what has happened to the 2,000 men who used to be employed in the same plant back in 1947 ? Well, to begin with this mechanisation was not brought about suddenly ; it took quite a number of years, so they were not all thrown out of work at once, but had plenty of time to get absorbed into other jobs. Some of them, of course, still have to remain at the plant because the more completely automatic the machinery, the more danger there is of a breakdown, and if one little pin on one little machine should break, the entire plant automatically shuts down until repairs can be made, so there has to be a very large maintenance crew.

Then again, refrigerators have become so cheap that everybody can afford to buy not only one to keep the food in, but an extra one to keep the beer cold, and some of the men have gotten jobs selling them. The demand for electric motors has become so great that some of the men have been hired as motor makers, and this has created so great a demand for copper wire that some of them are now working as wire drawers. So much cotton is now needed for insulation that one man went back to his ancestral acres, started growing cotton and got rich at it. More lumber was needed for crating, so some started working in a lumber mill, and one got a job in a factory to replace a man who had gone back to the North-West to resume his old calling of lumberjack.

Keeping tax matters straight in a plant like this is a major job, what with obsolescence and replacement, so five chartered accountants are needed, and one man put his son into that business and now lives comfortably at home on his son's earnings. The greatly increased demand for steel necessitated steel mill expansion and some workers were needed for building and others as steel workers.

I think by now we have about run out of men and have not only absorbed the 2,000 we first talked of but a whole lot more, and there are still jobs going begging on the railways hauling all this extra freight, in motor transport, in the repair business, in making hinges, locks and other hardware, in glass for shelves, in paints and in a thousand other industries which at first might not seem even remotely connected with the original refrigerator plant.

And of course somebody still has to make the machines that do all this wonderful work, and to make the machines that make those machines.

Perhaps some of what I have said seems absurd, but it is none the less true, and is certainly not so far fetched as the statement that machine tools destroy jobs.

The whole thing is so simple. If we can make more goods, we can make them cheaper. If we can make them cheaper we can create a demand for still more of them, and in spite of introducing automatic machinery, we have to enlarge our factory and hire more men to take care of those machines, as well as to give work to the men who make those machines.

I said before that I wasn't going to give you a lot of statistics, and I meant that, but to point up what I have said just now, I do want to give you a few figures and here, gentlemen, I must use American figures because I am not familiar with English equivalents. Just think back to about 1920 and try to remember what your mother's washing machine looked like—if she had one. It cost her about 170 dollars (£35), and a dollar in those days meant a lot more than it does now. In that year there were about 5,000 people employed in making washing machines. Ten years later, the machine had improved to the type that most of us now have, sold for only about 100 dollars (£20) but, because machine tools had been put to work in that industry, 7,000 men were employed. By 1940 the washer had become fully automatic, sold for something less than 100 dollars and gave employment to nearly 10,000 workers. At the present time I'll grant you they cost considerably more, because of the general inflationary trend, but, in terms of hours of labour required and in terms of present day salaries, they actually cost less to purchase. You'll appreciate that if you compare your own salary to-day with what you got in 1940. And all the time you have been getting not only a cheaper but an increasingly better product.

The same situation holds true in any industry—refrigerators, vacuum cleaners, gas stoves, radios and of course especially in automobiles. Less than 40 years ago the auto was a cranky, cantankerous contraption, completely unreliable, made by hand in rickety sheds down back alleys—and you had to be in the class of a yacht owner to possess one. Look at the automobile industry to-day—the biggest business in the United States, giving employment to over half a million workers on its own account, to say nothing of the countless hundreds of thousands of jobs created by the ever-increasing demand for rubber, glass, textiles, steel, electric power, gasoline, oil and all the other products directly and indirectly associated with it.

And what created that industry? Machine tools and nothing but machine tools. Oh yes, human ingenuity was put to work; Henry Ford originated the production line, but it wouldn't have been any good unless machine tools had first been created to make the line possible. But that is only the beginning. We are prone to consider automobile production at our present rate of 1,000,000 cars a year from each of several manufacturers as the ultimate in high production, but I tell you that production in the future is going to make to-day's production methods look as slow as those of a hundred years ago. How do I know it? Why, just the same way that you can know it, by looking around and seeing what machine tool manufacturers are doing. Every day there is a new machine introduced that will work faster, better, more economically and with less manpower. But does that mean more unemployment? Certainly not. It means a continued demand for more and more men to make the steel and the brass, to handle and sell the finished product, and to operate still more machines that are purchased to keep up with the increased demand brought about by lowered costs.

Consider your forefathers—they ploughed the ground with a forked stick and reaped the grain with a sickle. They didn't have big farms because one man can work only so much land, and he could grow only enough to feed himself and his family. But look at the farmer to-day. With the aid of agricultural machinery—tractors, reapers, harvesters—made by machine tools, at a price he can afford to pay, he can cultivate as much land as fifty of the old-timers, can give employment to a number of workers, and sell his surplus for enough to provide his son with a college education, own a car, and live in pretty solid comfort.

You know, the more I think about this the more ideas come to me, and I can't think of a single case in which machines have destroyed jobs. A power shovel can dig the basement of a house in a single day, and it used to take ten men with shovels ten days, but by the same token it would take a hundred men a year using teaspoons, and while you're waiting that year, what can the carpenters and bricklayers be doing, and the paperhanger and painter, and furniture maker and coal miner, and furnace maker—why, they'd all be starving to death. No matter how you turn you can't get away from it. Machine tools make jobs.

And now, gentlemen, I have talked a good deal about machine tools and you have been very patient in listening to me, but I would like to take a little more of your time by showing some outstanding examples of the very latest developments. As you may know, there is being held in Chicago this September the largest Machine Tool Exposition the world has yet seen. More than 500,000 square feet of floor space will be covered by exhibits of machine tools in which will be combined all the skill and ingenuity and all the experience

of past years. Complete automatism, incredibly high production, and accuracy to the *nth* degree will be the outstanding characteristics of the new equipment to be shown.

I don't suppose many of you will have an opportunity to visit this show, so I have managed to persuade some of the builders to let me have a few pictures of what they propose to reveal for the first time at the show: Of course, I can't show them all and I have had to restrict my illustrations to only one machine for each of about a dozen builders, but I think they will serve to give you some idea of to-day's trend in machine tool design, to give you a sort of preview of the Machine Tool Show and to let you see for yourselves the machines of to-morrow, the machines that mean bread and butter for you and your families. Yes, and not only bread and butter, but cakes and ale too ; that mean better wages, better living, greater comfort, not only for you but for the whole world and that, because of this, must mean international peace and a more abundant life.

**Captions for illustrations to**
**"THE MACHINE TOOL AND YOU" by H. E. Linsley.**

FIGURE 1. Three-head milling machine, the idea behind which is to add greater flexibility to a production type mill without sacrificing accuracy. Each of the 3 spindles is driven by a 25 h.p. spindle motor. The horizontal spindle heads are mounted on movable columns so that the machine can be used on relatively narrow work, and at the same time can be adjusted for wider parts. Columns are positioned by power, as also is the vertical spindle head, and all members are provided with power clamping—all of which can be operated from the push button station. By positioning the columns, there is a minimum of overhang to the cutters on narrow parts.

FIGURE 2. Hob sharpening machine. It is claimed that this machine will not check, crack or snap off hob or cutter teeth, and that the accuracy of the settings and operation is such that regrinding for correction is eliminated. Lead accuracy is 0.0005 in 3 ins. ; positive and negative rake alignment is within 0.0005 in. on straight gash and 0.001 in. on helical gash cutters. Spacing accuracy on adjacent teeth is 0.0005 in.

FIGURE 3. High production turret lathe designed specifically for working in brass, aluminium and other non-ferrous metals. The automatic drum control on the turret slide provides automatic spindle speed control for each tool position. After presetting this automatic pilot, complete automatic control of the headstock is provided, making it unnecessary for the operator to shift levers for spindle positioning, starting, stopping or reversing the spindle. Another feature is the spindle positioning device which stops the spindle at the same position each time for convenience in loading and unloading. This can be switched off if desired. This machine thus fills the gap between the hand-operated turret lathe and the full automatic screw machine.

FIGURE 4. Electronic toolroom lathe. In the illustration the control panel cover is removed so that the elaborate electrical control system may be seen. This lathe is frankly experimental, and when it is put on the market it will probably use a less expensive driving arrangement than the electronic. The headstock contains two driving mechanisms ; a high speed direct belt drive for use with carbide tools with a range of 22 to 1,500 r.p.m., and a gear drive for heavier stock removal with a range of 3.6 to 250 r.p.m. All spindle speeds are selected by turning a dial. Carriage and tail stock are power operated, the apron contains its own automatic lubrication system, and the totally enclosed quick change box is also lubricated automatically.

FIGURE 5. This machine was specially designed as a precision piston boring machine for finishing wrist pin holes in aluminium alloy automotive pistons. Work is fed into the machine from a chute and the finish bored pistons ejected on to a conveyor at the rate of one piston every 30 seconds. The pistons come to the machine "as cast" and the holes are roughed and completely finished. Holes are aligned with the boring bar automatically, and automatically clamped. One bar holds both the roughing and finishing tools, the two roughers removing about 0.040 in. stock, and the finisher about 0.010 in. Size is held to limits of 0.7502 to 0.7505. The roughers hold size for several days and the finisher requires adjustment only about once a day. All the operator has to do is keep the chute filled with fresh pistons and see that they are all pointing in the same direction with the short end forward.

FIGURE 6. Filmatic hydraulic universal grinder which features an electronic headstock drive capable of giving infinitely variable work speeds from 50 to 600 r.p.m. Table traverse rates can also be varied infinitely from 3 to 280 r.p.m. The sizing adjustment is exceptionally accurate and is controlled in increments of 0.0001 in. The machine is unusual in that it combines the functions of both internal and external grinders. The maximum O.D. size is 10 $\frac{5}{16}$ and the maximum I.D. 2$\frac{1}{2}$ ins. Minimum I.D. is $\frac{3}{4}$ in. The internal attachment is hinged and can be swung into position without any trouble.

FIGURE 7. Fay automatic lathe. The illustration shows it arranged for the third operation on automobile pistons, a job for which it is particularly well suited. The piston is located from the I.D., and supported by an air-operated tail stock. The drive is by air-operated pins in the wrist pin bosses. The skirt is turned elliptical by a carbide tipped tool on a special cam-operated holder, and simultaneously the head is finish faced by a carbide tool which relieves at a point $\frac{1}{16}$ in. from the centre, to avoid scoring on the return stroke. Four grooving tools rough the ring grooves, one chamfers the skirt and one forms the O.D. at the head of the piston. During the roughing an end-cut multiple chamfer tool chamfers the ring groove lands and then the ring groove lands are finish formed. Finally the grooves are finish-cut. Floor to floor time is 15 seconds.

FIGURE 8. Intended particularly for heavy cuts with carbide tools on long shafts, this automatic lathe has a 75 h.p. motor. Both spindle and front carriage drive units are provided with two different driving gear centres to provide an increased range between high and low spindle speeds and carriage feeds. In addition, the number of feeds and speeds from each set of gears is doubled. Complete control of all cycles is provided by adjustments of dogs on a cycle control disc, so that it is not necessary to make a separate cam for each different cycle. Changing the position of the dogs changes the lengths of rapid approach, feed and rapid return stroke. Tail stock is power operated for speed and convenience in loading heavy parts, and automatic declutching between spindle and drive motor is provided. A self-adjusting magnetic brake is used for stopping the spindle rotation quickly.

# MESSAGE TO THE INSTITUTION OF PRODUCTION ENGINEERS FROM THE PRESIDENT OF THE AMERICAN SOCIETY OF TOOL ENGINEERS

Members of the Institution of Production Engineers :

It is with extreme pleasure that I take this opportunity to send a message to our fellow engineers across the sea, to be conveyed by one of your own countrymen—an able editor of one of America's most respected industrial magazines—who makes his home in America. I want you to know that it is a privilege to co-operate with you in every way possible in implementing the dissemination of information about industrial processes and mass production methods, which cannot help but raise the standards of living all over the world by the expedient of providing more goods for more people at less cost. Basically, that is the ultimate aim of America's tool engineers, and I am sure that is a fundamental reason for the existence of your great society.

I could devote the few minutes allotted to me on this programme to weaving a patriotic theme of closer co-operation between the two great democratic countries, or to quoting broad platitudes that would be of little value to a closer and more constructive type of co-operation between these two sister societies. But rather than engage in such empty platitudes, I believe that it is entirely proper and fitting that I should tell you something about the aims, objectives and accomplishments of the American Society of Tool Engineers, and more especially about some of the specific programmes of this Society that are geared to helping industry in solving some of its complex problems. After all, the battle of production is the most important conflict in our present world economy in which people of every country are hungry for every conceivable kind of manufactured product.

First of all, let me say that in America there is hardly such a thing as a secret process in industry. Through our engineering societies and their media of communication and the great industrial publications that serve our manufacturing enterprises, there is a wide dissemination of information on specific industrial techniques, applications and processes which enables all technicians and all of the manufacturers, both large and small, to benefit by the experience of those who have done the basic research in developing those techniques. Those of us who are close to industry are convinced that this practice has been largely responsible for industrial expansion in America, and for the universally recognised efficiency of our mass producing industries.

The time allotted to me on this programme is too short even to mention many of the projects and activities of the various A.S.T.E. Committees, and to explain in detail how these activities are gaining unprecedented productivity in a land where high productivity is synonomous with high living standards. And so, without going into detail, I will touch briefly upon a few of these activities now in progress which, in my opinion, are most closely related to industry's programme of education and self-improvement.

To begin with, American industry is more active to-day than ever before in intelligent standardisation programmes and procedures which are designed to reduce the cost of manufactured commodities and to make the products of industry available to more people. It is felt in our country that soon an international standardisation programme must gain momentum. These programmes, whether national or international, will also improve the quality of manufactured goods, reduce service costs, and provide steadier and healthier profits to the producers of all types of manufactured goods.

With these things in view, our Society has an active National Standards Committee and a local Standards Committee in each of its 76 Chapters. The national group is working with the American Standards Association which, in turn, is working with the various international bodies toward a concerted programme of industry controlled standards. It is, at the same time, disseminating myriad types of educational information to industry and to men within industry to help in accomplishing the broad goals of the present standardisation programme sponsored exclusively by manufacturers.

For a good many years, a part of the standards activities of the American Society of Tool Engineers has been devoted to the publishing of Data Sheets, furnishing to members of the A.S.T.E. technical information and data on the machines and tools that are used in our industries. These Data Sheets save an incalculable amount of time and help the tool engineer in selecting the proper equipment for various production jobs.

Because the number of these Data Sheets has become quite large, the National Standards Committee of the American Society of Tool Engineers has recently devised a numerical indexing system, based on the U.S. Standards Commodity Index for the efficient filing of the engineering information so presented. Since this Index has been published, a number of industries have found other uses for it. For example, one large Canadian automobile manufacturing plant has classified and catalogued all of its machines by the new A.S.T.E. Numerical Index. Indications are that this system for

classifying technical information and cataloguing industry's machines will find a great many other uses throughout the metal manufacturing field. Sample copies of this Index are presented here for your inspection.

Our Educational Committees, both local and national, are busy devising the ways and means for training future tool engineers. The long-range programme of the National Education Committee involves placing in colleges and technical schools adequate courses in the specialised field of tool engineering, and the organisation and production of textbooks geared to serving the needs of modern industry.

As you know, the practice in America has been to grant special degrees in various branches of engineering as these branches have established themselves as qualified subdivisions in the broad field of technical education. In England, we are told, the educational institutions grant but one degree, which is the Bachelor of Science in Engineering. But since it is the practice in America to grant degrees such as Bachelor of Science in Mechanical Engineering, Chemical Engineering, Metallurgical Engineering, and so on down the line in the various specialised fields, it is one of the aims and objectives of the A.S.T.E. to see eventually a degree conferred by American technical schools designated as Bachelor of Science in Tool Engineering.

Recent surveys conducted by your sister Society in America have shown conclusively that the horse-and-buggy teaching methods and out-moded textbooks used in many of our institutions of learning cannot possibly meet the demands of the more efficient manufacturing systems that are constantly emerging from laboratories and proving grounds. Therefore we, as a Society, have set about publishing textbooks and developing a literature in our field that will be adequate to meet the urgent needs and demands of a more technological civilisation.

The first textbooks published by the A.S.T.E.'s Educational Committee are already offered to American Schools and colleges, and are being used to improve the knowledge and efficiency of tool engineers already engaged in industry. More books are now in process, and soon a whole series of text and reference books will be available to students, institutions, manufacturers, and individual practising engineers.

Under the general heading of education, although this activity I am about to mention is handled by a separate committee, I would like to tell you briefly about the Tool Engineers' Handbook. Two years of endeavour and many thousands of man-hours of research and committee work have already gone into this veritable encyclopedia of tool engineering information. When it is completed, it will be the first volume of its kind ever published. Our current

schedule and time-table indicates that this work will be available to industry and others during 1948. Here, for the first time, specific standard data on industrial processes applicable to the art and science of tool engineering will be codified into one volume containing about two thousand pages. This work will be complete with charts, graphs and illustrations, and will be indexed and cross-indexed for ready reference by students and practising engineers alike.

This year, for the first time, the American Society of Tool Engineers is engaging in a professionally directed public relations programme. This programme is paying large dividends to our Society because it has been designed to aquaint industry with the role of the tool engineer in our expanding economy, which is constantly becoming more dependent on highly specialised industrial techniques. This public relations programme is also beamed at acquainting the workers and the general public with the commonsense principles of economics inherent in our system of predominantly free economy; and to stimulating interest and activity in more effective technical education for tool engineers. This hard-hitting, aggressive public relations programme has been hailed by many industrial leaders and by the publications serving industry as one of the most effective works of its kind ever sponsored by a trade association or a technical society. Here, again, the job is one of education. This time, much of the educational emphasis is on circulating information that will help in preserving our system of predominantly free enterprise, and in promoting better understandings between individuals and groups in our industrial economy, because we feel that these things have been immeasurably responsible for the unprecedented industrial growth of our country which has taken place in a comparatively brief span of years.

Just as the Institution of Production Engineers publishes its monthly Journal, the American Society of Tool Engineers publishes The Tool Engineer, which is the official organ of our Society. In addition to the news of the Society's activities, technical articles bring to the readers of this publication the latest developments in tool engineering and mass production methods. This periodical is read carefully in our institutions of learning and in our research laboratories, as well as by more than 18,000 tool engineers in the United States and Canada. Some two hundred public libraries on the North American Continent subscribe to The Tool Engineer and a large percentage of them preserve back issues in bound volumes. Another two hundred or more copies of the magazine go to the various other countries, possibly about half of this number being distributed in England, so that nearly every country on the

face of the globe can share in the information and data collected by American tool engineers, all of which advances the science of mass production in every civilised corner of the globe.

Still another phase of our educational activity is the work carried on by our National Programme Committee. Its activities bring to our two national meetings held each year some of the country's top specialists in their respective fields to inform our membership of the best and latest techniques in tool engineering. Utilising the full time of a staff employee, this group also helps in making available to each of our 76 Chapters speakers and programmes, as well as motion pictures and visual aids, for the sole purpose of more adequately equipping our members to serve industry better in its rapidly improving manufacturing methods.

Last, but not least, our interest in educational programmes to improve our profession prompts us to sponsor a national tool exposition every two years. At our last show in 1946, we were favoured by the presence of several industrialists from your country. We sincerely hope that when our Society convenes for its show in the middle of March, 1948, we will have the pleasure of welcoming a larger number of representatives of British industry.

This giant show brings graphically to our membership and to the representatives of industry throughout the world, as well as to a large cross-section of technical industrial employees, an actual demonstration of the most recent machines, tools and techniques that may be employed in their industries for greater and more efficient production. Our last show attracted nearly a hundred thousand visitors and, according to the daily newspapers, represented an expenditure on the part of the exhibitors of some two million five hundred thousand dollars. Most of these exhibitors have already indicated a keen interest in showing in our 1948 exposition, which has just been announced.

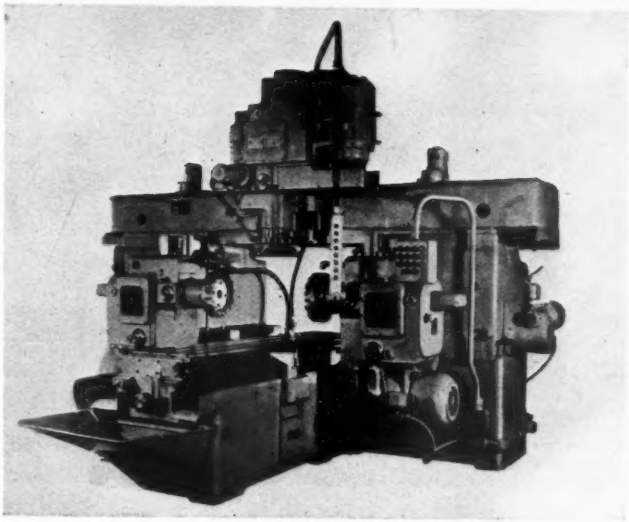
And so you see, gentlemen, our integrated programme in America is one of which the sole objective is that of education. We realise, and industry realises, the tremendous need for better trained engineers and technicians. Therefore, it is easy to see why industry in America appreciates the efforts of the Society, and to see how the activities of this technical group, scattered throughout our 48 States and Canada, serves the best interests of both industry and our members who are industry's employees.

Many technical innovations developed by British engineers in the crucible of war have resulted in better manufacturing methods in many American industries. Likewise, methods employed in America found a useful place in your war production programme and have been used since for increased British production. It therefore seems reasonable to assume that an expansion of our channels of communication to disseminate information on these

# AMERICAN SOCIETY OF TOOL ENGINEERS

## *Visit of Mr. H. E. Linsley*

A full report of the Dinner held in Wolverhampton on July 19th, 1947, in Mr. Linsley's honour will be published in the September issue of the Journal.



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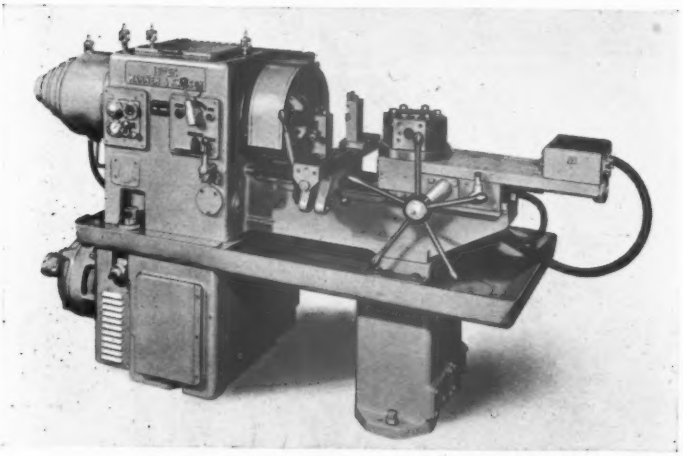

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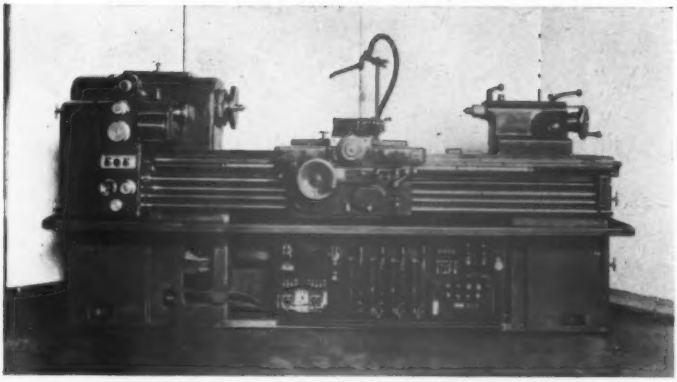

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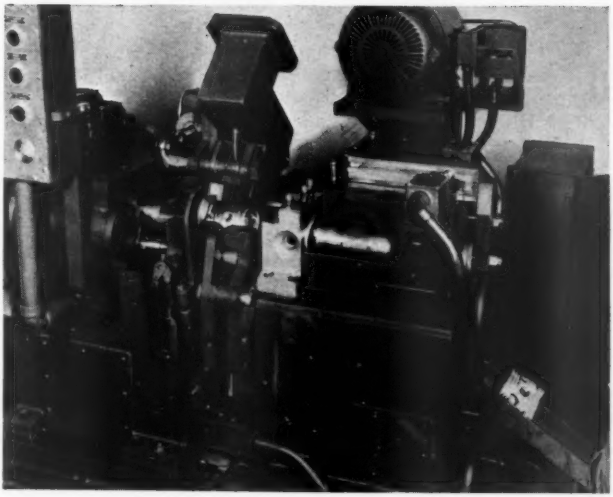

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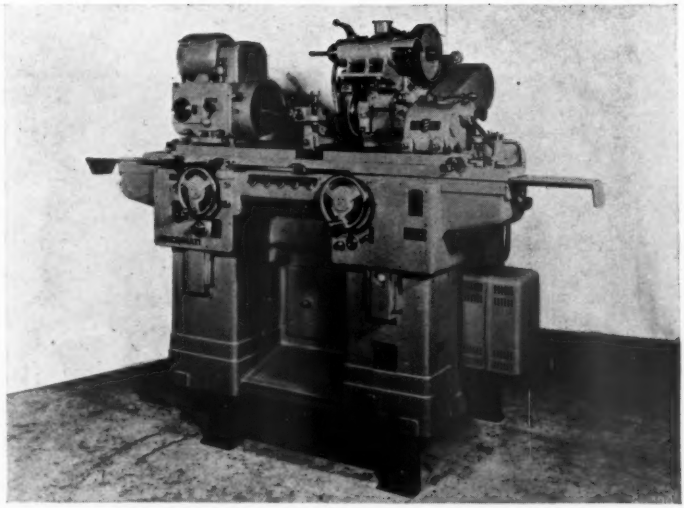

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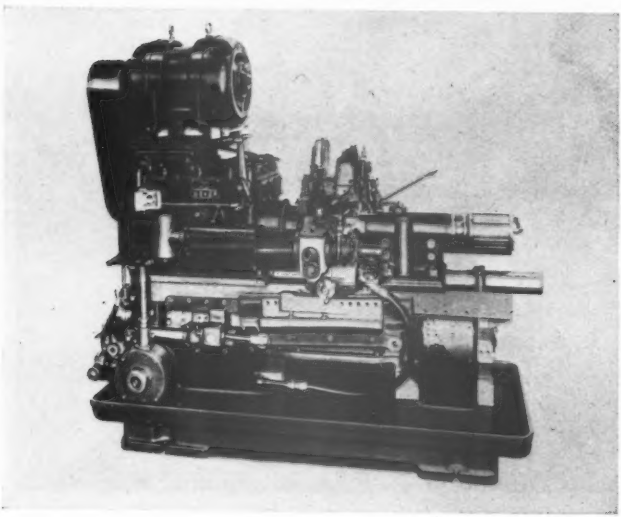

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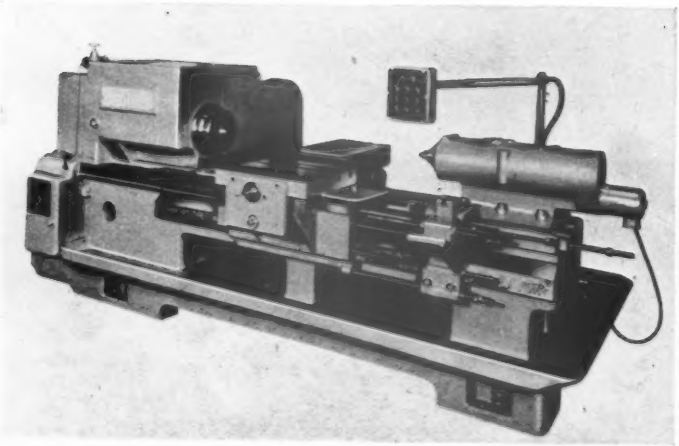


FIG. 8.

advances would be in order. And so, in conclusion, may I urge a closer and even better co-operation between the Institution of Production Engineers in Great Britain, and the American Society of Tool Engineers in the United States and Canada. We are brothers in that we subscribe to the same principles of democracy, the same high principles of government by the people, and the inherent dignity of man, as opposed to certain totalitarian ideologies that would lead us away from the great blessings of individual freedom that are enjoyed by your people and ours. We have more in common than most of us realise, and I am sure that each of our countries needs the other and each of our technical societies, likewise, needs the other. Therefore, as President of the Society which is your American counterpart, I extend to you the use and privilege of all the facilities of your American sister organisation, the American Society of Tool Engineers. In token of this hope for better and closer co-operation between those two great technical groups, I present to you this Code of Ethics of the A.S.T.E.

W. B. PEIRCE.

# "PROFESSIONAL CHARACTERISTICS AND OBLIGATIONS"

by DR. W. A. J. CHAPMAN, M.Sc.(Eng.), M.I.Mech.E., M.I.P.E.

*Presented to the Wolverhampton Graduate Section of the Institution of Production Engineers, May 15th, 1947.*

It may be assumed that because my listeners are at this meeting they are young men activated by serious motives regarding the pursuit of their profession. As one advances through life, and through the phases of following a profession, one receives a training, assimilates ideas, meets people and observes the inter-play of personal associations and their influence on development and progress. The study of human characteristics, habits, strengths and weaknesses is an interesting one and is carried out by intelligent observation at all times. It is not necessary to study from books, nor to attend a Technical College. The result of such studies bring much interest, a great deal of amusement and a fund of valuable technique for use in life and in professional practice. According to our ancestry, the circumstances of our early life, our schooling and the type of early training we receive, we have given to us certain qualities which have significant influences on our character, habits and our behaviour in later years. Habits and knowledge acquired before the age of about 25-30 direct the later course of our lives in a very influential manner. If we are to lead a full life and carry out our obligations to society, we must take care that the restrictions and bias brought about by the training and life in a certain profession do not cramp our outlook and prevent the full development of our character and attainments. It is very easy for this to take place and the full value of many lives is reduced by the defect.

We might for a short time examine some of the aspects of our training and our lives as engineers, and compare them with other professions. Our energies are largely concerned with doing things rather than with talking about them so that we tend to become inarticulate. Certain worldly standards tend to assess a person by his ability to state a case, irrespective of its merits, so that when we stand up alongside—shall we say—a member of the legal profession, or of the Church, we often show up in an inferior light. For this reason the responsibility of local and central government, responsible posts in associations, trades unions, etc., often pass into the hands of those who are able to express themselves easily, even though they may have a very insecure background of supporting knowledge. Talking professions are reading professions ; to read is the training for good ability of expression.

One good quality imparted by an engineer's life is his generosity in the broad principles of things. This I think is caused by his contacts with natural science and phenomena. Nature is big and generous. She is generous in giving, but she is just as generous in taking away. Engineers tend to assimilate this attitude and the tendency is not to be wondered at. Examples of the broad application of this quality are shown in many ways. An engineer gives freely and generously of his advice; compare his attitude with (say) that of a lawyer. In one aspect only does an engineer tend to be "near," and that is in his use of wealth, be it hard cash or material. His training teaches him to conserve the wealth at our disposal and a habit is acquired which remains with him throughout his life. My own training, coupled with a rather stringent early life, has given me this characteristic strongly, so much so that I often envy those who can enjoy the luxury of certain extravagances which by many are regarded as wasteful.

Commonsense and proportion are strong characteristics in an engineer's make-up. It is easy to understand why this should be the case and they are valuable assets, particularly in the world as it is to-day. In observing traits of other professions it is possible to see some amusing examples of unbalance. I never fail to be amused at the accountant who will sit up all night to trace the loss of a penny on some involved statement of accounts. You may imagine the effect on the outlook of this profession, by the serious attention given to such points. The secrecy with which some professions clothe their activities is another source of regret, and of some amusement. I do not think the bad writing of the medical man is always because he is in a hurry, but often that he does not wish the layman to be able to read it. A doctor will seldom take his patient into his confidence. Contrast this with the attitude of the salesman or commercial traveller whose attitude can never be called that of invoking secrecy, but whose statements often require serious investigation before they may be accepted.

Before passing to individual characteristics I must mention one important group characteristic which may in the future ascend to an important place and influence. When persons are organised in large groups such as the combines, railways, civil service and armed forces, a great amount of delegation of authority is involved and the individual be he high or low, tends to become a cog in the machine. Often recruited at an early age from a stereotyped education, he enters some branch of this machine and with little opportunity to widen his knowledge he advances, obtaining his salary increments in due time, passing to higher grades in an ordered sequence, living in his little suburban villa, going out in his car, cutting his lawn, making his weekly visit to the cinema, bringing up his family, and making sure that they follow in his

footsteps ! Whatever may be the demerits of small units of industry under private enterprise, they do offer conditions which promote initiative and interest in their personnel. The staffs of large organisations become stereotyped in working to rules, and become denuded of a sense of proportion, initiative, and, in some cases, common sense. An instance of this occurred to me recently in connection with the despatch of a registered packet in the post. The packet was sealed in the correct fashion but to give additional strength I tied a piece of string round it. The counter assistant would not accept it because the string knot was not sealed with wax. I thereupon cut off the string and handed the packet back, when it was accepted without question.

In addition to general occupational characteristics there are many outstanding individual, personal eccentricities, some good, others bad, many interesting and amusing. A number of the oddities which we may ascribe to others may be deliberate habits acquired with the object of overcoming some known weakness. A good example of individual characteristics is given by the individual habits of Principals of Technical Colleges. As you may realise, the duties of a Principal involve administrative work in the College, supervision and guidance of staff, some knowledge and contacts with the students, local outside contacts, committees, etc., national outside contacts, committees, etc. If we observe how Principals interpret their function we find that some of them hardly ever go outside their College, whilst others spend almost as much time on the outside activities as they do in the building. No doubt both types would be able to present a convincing case that their method is the best in the interests of technical education.

Doubtless you have all encountered the individual who keeps everything under his own hat, so fostering within himself the idea that he is indispensable, whilst opposed to him is the one who farms all his work on to his subordinates. In the first instance the case is probably a second rate mind which fears that someone may learn a little more than its owner (who generally knows very little) and supplant him in his job. The second characteristic is better, provided the one who farms his work could do it himself if necessary, does not take advantage of the work of others for his own benefit and is attending to higher things whilst others are doing his "work." As our last examples of individual characteristics we might take two opposing qualities. One concerns the individual who shelters behind a barrier of "dignity" and often sets himself in an unapproachable position. I have often tried to pierce this barrier and have formed the opinion that it is sometimes caused by timidity and nervousness, sometimes by insecure knowledge. As opposed to this quality is that of the person who is unselfish and co-operative in all things. Unfortunately such an individual

often has a poor deal in a world which tends to take advantage of such qualities and treats them as weaknesses to be squeezed for further concessions. We may also observe this attitude being applied on an international scale between whole nations.

The aspects of a person's characteristics and obligations are very closely connected and are in many cases interlocking. The problem is further involved by the status which has been given by society to certain classes of workers and to the interplay of feeling between social classes, and their so-called privileges. I might take the mine-workers as a present-day example. These men are being exhorted to display public spirit in increasing their production. The history of their work contains terrible instances of children being forced to labour for long hours under awful conditions, and for over a century the miners have been treated, by society, almost as a caste apart. With the effect of this treatment on their personal characters, it is small wonder that they find difficulty in assuming the public spirit required for rising to the occasion demanded at the present time.

As a general approach to our professional obligations the foremost and outstanding one, to be kept ever as the objective, irrespective of the profession, is the giving of service. We should keep this ever before us and in our work we should always give this service without thought of any immediate pecuniary gains. As a general rule society will reward those who give unselfish service. Naturally this rule must be operated with common sense and to make it a guiding rule is not to neglect one's own welfare. For example, a man may be giving unselfishly of his service and his work may be used by an unscrupulous superior for the furtherment of his own welfare. It is not correct for the victim to blame society for not rewarding his work. He should have the sense to assess the position and transfer his assistance to a quarter in which it will be appreciated and rewarded at its true worth. As young men you must accept the principle that you will have to do a great deal of work for medium or small pay and see others reaping most of the praise and benefits which accrue. However, this will not be a permanent feature in your career if you manage your affairs as you should.

As you advance in your profession you should reach the stage when others do for you as you did in the early days ; may I hope that you will not have forgotten your own reactions at that time ? When you are higher in the profession you will still be required to give much service for nothing, and probably work harder than you did when younger, but your approach, and the conditions will have changed. (It is a curious state of affairs that to gain any eminence in a profession one has to work very hard, and when the eminence has been gained one has to work harder still to remain in the limelight !) It will be necessary, very early in your career, for you to

learn to assume responsibility and to give confidence to your superiors in assigning responsibility to you. Be careful, however, that in assuming responsibility you fulfil the obligations concerned, as nothing is more likely to ruin your career than such a happening. A subordinate who infuses confidence into his superiors and then fails them might as well be dead. Knowledge and experience are necessary to give the confidence required for assuming responsibility and for showing initiative. This last quality is extremely important as subordinates without initiative are never likely to be given the chance which might be the turning point in their career.

At all stages during our careers we have human contacts to make and the methods we use in handling these will influence not only our own life and future, but also the lives of those with whom we work. An early lesson to learn is that of "suffering fools gladly." We all have to put up with this and if we can learn to suffer them patiently we shall have learned a lesson which helps all down the scale. Politeness costs nothing, but its lubrication value is extremely great. A further important personal characteristic, particularly when in charge of others, is that of consistency and reliability in one's behaviour. If subordinates cannot rely on the temper and reactions of their chief from day to day, or even sometimes from hour to hour, efficiency will be lowered. According to their personal make-up some will be indifferent, others unhappy, and so on ; unhappy workers often mean unhappy wives and families. Loyalty is an important obligation in every organisation. It is essential for subordinates to be loyal to their superiors and vice versa. Nothing is more likely to undermine the morale of a group of people than lack of respect, and breach of the etiquette of loyalty. Naturally, cases arise where subordinates lose their respect for their superiors and superiors lose confidence in their subordinates. To discuss, in derogatory terms, one's opinion and feelings with others, and to grumble, is not likely to effect any improvement in the situation. A subordinate may lose his respect for a superior on some account for which it would be unfair, and unprofessional, to undermine the chief's position by a campaign of grumbling and criticism amongst fellow workers. Probably the only solution in such a case would be to look round for a change of job. In the same way for a superior to belittle a subordinate amongst his associates is extremely bad practice and unfair to the man concerned. In this case it is preferable to clear the matter by a showdown, or as a last resort, to dispense with the services of the man concerned.

One characteristic which an engineer should acquire by virtue of his training is common sense. This is a very valuable quality to possess and is one which we may fall back on in times of trouble and perplexity. Common sense should develop instincts in our

nature to guide our policy and reactions. It should, as we grow older, guard us against continually knocking our head against corners, and putting our foot into things. Nothing but this simple quality will prevent our thinking all is well when it is not, or burying our head in the sand so as not to see what we do not wish to see. Common sense should warn anyone with a 1 h.p. body or brain that they cannot put up a performance requiring many times that power. Common sense should give us a sense of humour without which our lives are likely to be dull, and our friends few. Common sense should tell an office boy that his chances of a rise are not improved by being late every day, and it should tell the manager that the chances of getting the staff to keep good time are not helped by *his* regular lateness.

For my closing observations on our professional obligations, I should like to make a few suggestions on matters outside the profession. It is an obligation on us all to maintain our minds in a state of freshness and if possible, even in advanced years, to preserve a youthful outlook. We shall do this by preserving a simple mind and providing ourselves with such spare time occupations as will encourage this state of affairs. It is a very serious mistake for anyone to have no time for anything but his work. Moreover, those who claim that the factory could not go on unless they spent so many hours there display a serious weakness in their organisation. They should be bringing up responsible subordinates, otherwise what would happen if they should die to-morrow? I remember once hearing one of my fellow workmen say that as soon as he left the gate his job was put out of his mind until he returned next day. At that time I thought such an attitude to be awful, but I now realise that this man's philosophy had something to recommend it. I suppose two of the most aggravating types of bore are (*a*) the man who is always talking of his work (generally with himself in position No. 1); (*b*) the fond parent on the subject of his offspring. Engineers, and rather particularly Production Engineers, are rather prone to live with their profession, and I advance as a suggestion that you will be a better citizen and a better member of your profession if you spread your interest. Some time you will reach the age to hand on your tools to another and if, at that time, you have no alternative activity to absorb your interest your life will soon come to an end. A full life, and a full education, require many contributions. Contacts with many people and abstraction from the qualities of the finer ones, troubles, joy, travel, music, art, the theatre, the dance, good authors and so on. All these must be experienced intelligently if you are to take your place as a fully educated member of society. Your professional training is of a type which neglects many of these important contributions, but you must not allow your early

instincts to debar you from a full development. As a nation we require men with such qualities superimposed upon the steady and balanced character which is given by the training and life of an engineer.

Finally, let me assure you that to whatever eminence you may rise, and whatever wealth you may attain, your most priceless gift is the goodwill and respect of your fellow men. You will only gain this in full measure by establishing a tradition for fair dealing, and, whether your state be high or low by always being yourself. Affectations, and all the associated paraphernalia by which people seek to impress others and build for themselves a false position are worthless. Naturally, some of you are destined for high positions, others for the more lowly jobs. Whatever might be your ultimate level, provided you give service according to your ability your happiness will be assured. Thomas Grey, in his beautiful words has given us a picture of unselfish, remote devotion :—

> "Full many a gem of purest ray serene,
> The dark unfathomed caves of ocean bear,
> Full many a flower is born to blush unseen
> And waste its sweetness on the desert air."

## E.D.A. Explains—

# THE ELECTRICAL TIME SWITCH

The Electrical Time Switch, as its name implies, is a device for switching current on and off at previously fixed times.

### USES

The automatic control of street lighting is the most common use of the Time Switch; for this purpose the switch is designed to operate throughout the year according to the varying times of sunset and sunrise. The wide variety of other uses includes the timing of electric heat treatment processes in industry, the operating of factory sirens, the switching off of loads at peak periods to reduce the maximum electricity demand and the automatic control of shop-window lighting. In fact, wherever a time control is required for electrical equipment the Time Switch is essential.

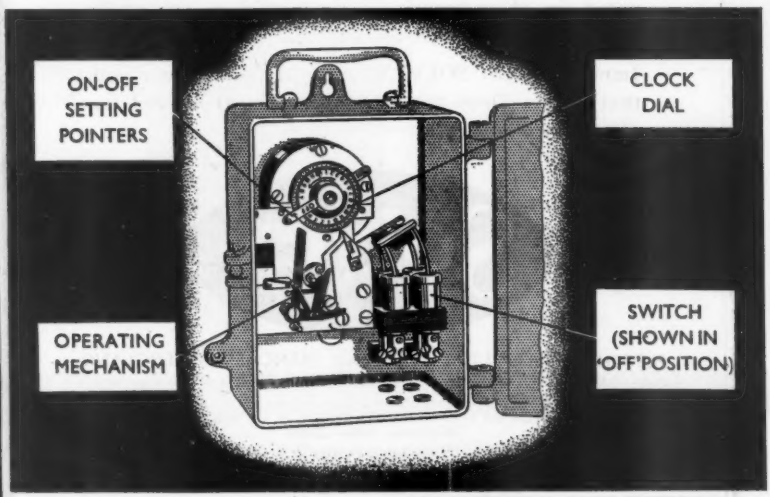
### COMPONENTS

The Time Switch consists of two parts — a clock with a setting device for on-off timing and a switch.

The clock may be electric, spring-wound or a combination of both, this latter system ensuring continuous operation even should the current supply fail.

### ACTION

Setting the clock is carried out by moving two pointers round the dial to the required switch-on and off times. At the switch-on time, the action of the clock operates a switch and current flows through the circuit until the clock automatically switches it off. Thus, once the clock has been set, a continuous cycle of processes may be performed without further attention being required.

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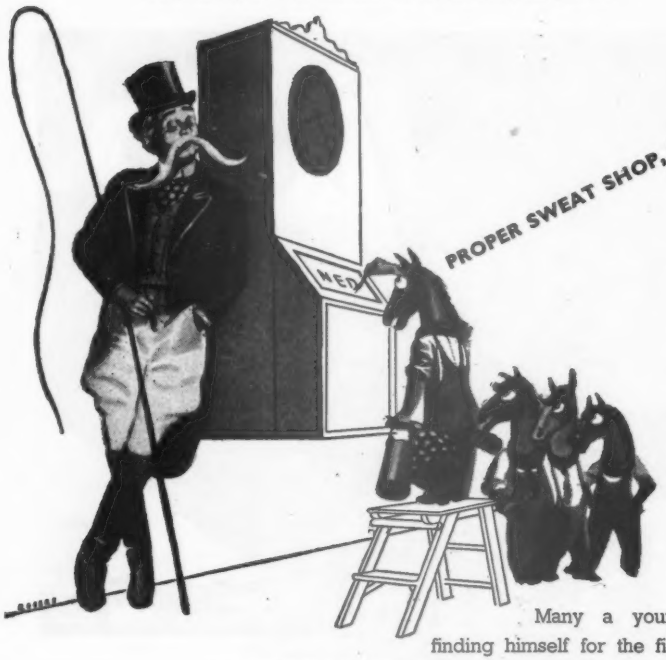


**(Industry is used to horse-power for driving large chunks of machinery. But to many it seems absurd to use a horse to turn a screwdriver or put on a nut—until they see our trained Desoutter horses at work in tiny tools that do the work of ten men at a fraction of the cost).**

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# Call up the little horses!

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# "Is your fuel cut as serious as it looks?

**My own looked like a knock-out, but I softened the blow"**

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What sort of advice did he give?

**First he told me how best to use the classes of fuel I am now getting. Then we went round the plant and he suggested a number of ways in which I could cut down my fuel needs. I soon managed to carry out the suggestions that needed no outside assistance, and plans are being prepared by my consultant for the rest — plans that will undoubtedly enable me to save on my present fuel allocation.**

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**Not really. As a matter of fact, my engineer had been pressing me to adopt some of the ideas for quite a while. I wish now that I had followed his advice in the first place.**

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| North-Midland | Castle Gate House, Castle Gate, Nottingham | Nottingham 46216 |
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| London | Mill House, 87/89 Shaftesbury Avenue, W.1 | Gerrard 9700 |
| South-Eastern | Oakfield Court, Grove Hill Road, Tunbridge Wells | Chatham 3238 |
| Southern | Whiteknights, Earley, Reading | Reading 61491 |
| Wales | 27, Newport Road, Cardiff | Cardiff 9234 |
| South-Western | 12/14 Apsley Road, Clifton, Bristol, 8 | Bristol 38223 |
| Midland | Temporary Office Buildings, Hagley Road West, Birmingham, 17 | Bearwood 3071 |
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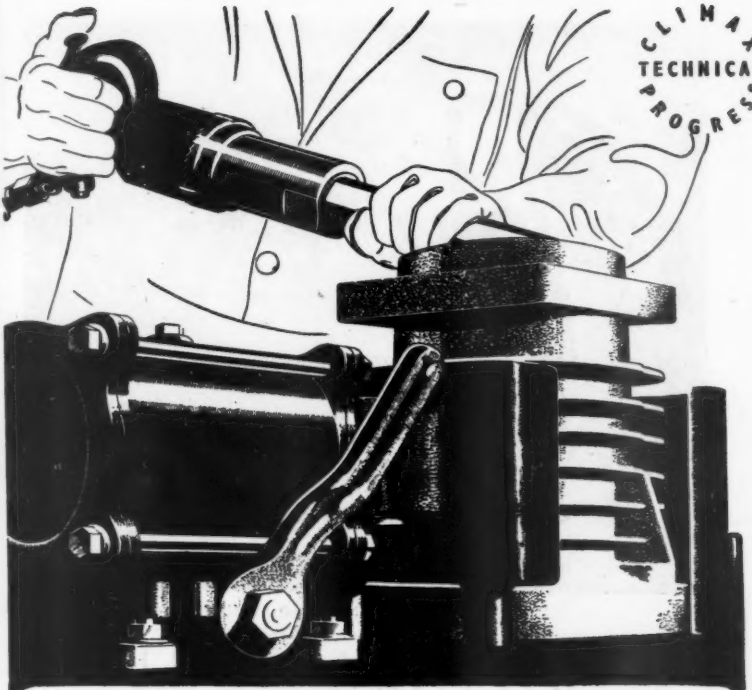


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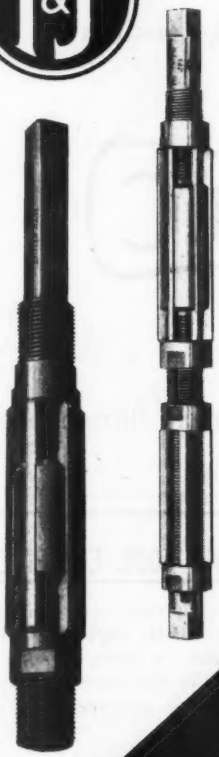
# EXPANDING REAMERS



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T & J Expanding Hand Reamers with blades of High Speed Steel are offered in a wide range of sizes from ¼" to 2½" as standard ranges. They are available with four, five or six blades according to size and pattern. Made of first class British materials in a factory planned specially for the production of Engineers' Small Tools, they provide a comprehensive range equal to the most exacting demands of the discerning user Individual reamers are packed attractively in cardboard boxes and complete sets in wooden cases are available for workshop or garage use.

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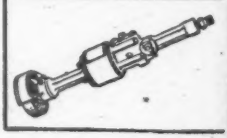

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